

Subpart F—Procedures for Testing Performance Characteristics of Class II Equivalent Methods for PM_{2.5}

SOURCE: 62 FR 38814, July 18, 1997, unless otherwise noted.

§ 53.60 General provisions.

(a) This subpart sets forth the specific requirements that a PM_{2.5} sampler associated with a candidate Class II equivalent method must meet to be designated as an equivalent method for PM_{2.5}. This subpart also sets forth the explicit test procedures that must be carried out and the test results, evidence, documentation, and other materials that must be provided to EPA to demonstrate that a sampler meets all specified requirements for designation as an equivalent method.

(b) A candidate method described in an application for a reference or equivalent method application submitted under § 53.4 shall be determined by the EPA to be a Class II candidate equivalent method on the basis of the definition of a Class II equivalent method given in § 53.1.

(c) Any sampler associated with a Class II candidate equivalent method (Class II sampler) must meet all requirements for reference method samplers and Class I equivalent method samplers specified in subpart E of this part, as appropriate. In addition, a Class II sampler must meet the additional requirements as specified in paragraph (d) of this section.

(d) Except as provided in paragraphs (d) (1), (2), and (3) of this section, all Class II samplers are subject to the additional tests and performance requirements specified in § 53.62 (full wind tunnel test), § 53.65 (loading test), and § 53.66 (volatility test). Alternative tests and performance requirements, as described in paragraphs (d)(1), (2), and (3) of this section, are optionally available for certain Class II samplers which meet the requirements for reference method or Class I samplers given in 40 CFR part 50, appendix L, and in subpart E of this part, except for specific deviations of the inlet, fractionator, or filter.

(1) *Inlet deviation.* A sampler which has been determined to be a Class II sampler solely because the design or construction of its inlet deviates from the design or construction of the inlet specified in 40 CFR part 50, appendix L, for reference method samplers shall not be subject to the requirements of § 53.62 (full wind tunnel test), provided that it meets all requirements of § 53.63 (wind tunnel inlet aspiration test), § 53.65 (loading test), and § 53.66 (volatility test).

(2) *Fractionator deviation.* A sampler which has been determined to be a Class II sampler solely because the design or construction of its particle size fractionator deviates from the design or construction of the particle size fractionator specified in 40 CFR part 50, appendix L for reference method samplers shall not be subject to the requirements of § 53.62 (full wind tunnel test), provided that it meets all requirements of § 53.64 (static fractionator test), § 53.65 (loading test), and § 53.66 (volatility test).

(3) *Filter size deviation.* A sampler which has been determined to be a Class II sampler solely because its effective filtration area deviates from that of the reference method filter specified in 40 CFR part 50, appendix L, for reference method samplers shall not be subject to the requirements of § 53.62 (full wind tunnel test) nor § 53.65 (loading test), provided it meets all requirements of § 53.66 (volatility test).

(e) *The test specifications and acceptance criteria for each test are summarized in table F-1 of this subpart.* The candidate sampler must demonstrate performance that meets the acceptance criteria for each applicable test to be designated as an equivalent method.

(f) *Overview of various test procedures for Class II samplers—(1) Full wind tunnel test.* This test procedure is designed to ensure that the candidate sampler's effectiveness (aspiration of an ambient aerosol and penetration of the sub 2.5-micron fraction to its sample filter) will be comparable to that of a reference method sampler. The candidate sampler is challenged at wind speeds of 2 and 24 km/hr with monodisperse aerosols of the size specified in table F-2 of this subpart. The experimental test results are then integrated with three

idealized ambient distributions (typical, fine, and coarse) to yield the expected mass concentration measurement for each. The acceptance criteria are based on the results of this numerical analysis and the particle diameter for which the sampler effectiveness is 50 percent.

(2) *Wind tunnel inlet aspiration test.* The wind tunnel inlet aspiration test directly compares the inlet of the candidate sampler to the inlet of a reference method sampler with the single-sized, liquid, monodisperse challenge aerosol specified in table F-2 of this subpart at wind speeds of 2 km/hr and 24 km/hr. The acceptance criteria, presented in table F-1 of this subpart, is based on the relative aspiration between the candidate inlet and the reference method inlet.

(3) *Static fractionator test.* The static fractionator test determines the effectiveness of the candidate sampler's 2.5-micron fractionator under static conditions for aerosols of the size specified in table F-2 of this subpart. The numerical analysis procedures and acceptance criteria are identical to those in the full wind tunnel test.

(4) *Loading test.* The loading test is conducted to ensure that the performance of a candidate sampler is not significantly affected by the amount of particulate deposited on its interior surfaces between periodic cleanings. The candidate sampler is artificially loaded by sampling a test environment containing aerosolized, standard test dust. The duration of the loading phase is dependent on both the time between cleaning as specified by the candidate method and the aerosol mass concentration in the test environment. After loading, the candidate's performance must then be evaluated by § 53.62 (full wind tunnel evaluation), § 53.64 (wind tunnel inlet aspiration test), or § 53.64 (static fractionator test). If the results of the appropriate test meet the criteria presented in table F-1 of this subpart, then the candidate sampler passes the loading test under the condition that it be cleaned at least as often as the cleaning frequency proposed by the candidate method and that has been demonstrated to be acceptable by this test.

(5) *Volatility test.* The volatility test challenges the candidate sampler with a polydisperse, semi-volatile liquid aerosol. This aerosol is simultaneously sampled by the candidate method sampler and a reference method sampler for a specified time period. Clean air is then passed through the samplers during a blow-off time period. Residual mass is then calculated as the weight of the filter after the blow-off phase is subtracted from the initial weight of the filter. Acceptance criteria are based on a comparison of the residual mass measured by the candidate sampler (corrected for flow rate variations from that of the reference method) to the residual mass measured by the reference method sampler for several specified clean air sampling time periods.

(g) *Test data.* All test data and other documentation obtained from or pertinent to these tests shall be identified, dated, signed by the analyst performing the test, and submitted to EPA as part of the equivalent method application. Schematic drawings of each particle delivery system and other information showing complete procedural details of the test atmosphere generation, verification, and delivery techniques for each test performed shall be submitted to EPA. All pertinent calculations shall be clearly presented. In addition, manufacturers are required to submit as part of the application, a Designation Testing Checklist (Figure F-1 of this subpart) which has been completed and signed by an ISO-certified auditor.

§ 53.61 Test conditions for PM_{2.5} reference method equivalency.

(a) *Sampler surface preparation.* Internal surfaces of the candidate sampler shall be cleaned and dried prior to performing any Class II sampler test in this subpart. The internal collection surfaces of the sampler shall then be prepared in strict accordance with the operating instructions specified in the sampler's operating manual referred to in section 7.4.18 of 40 CFR part 50, appendix L.

(b) *Sampler setup.* Set up and start up of all test samplers shall be in strict accordance with the operating instructions specified in the manual referred